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ABSTRACT

This project proposed to design and develop interactive videodiscs for teaching learning theory to teacher education students. The thesis was that simulations provided via interactive video could help prospective teachers both "see" the use of learning theory and more readily transfer theory into practice in the classroom. The intended audiences were students in teacher training programs for both the elementary and secondary levels at Brigham Young University (Utah). The project had three primary emphases: (1) transfer of different forms of instructional materials to videodisc so they might be evaluated by the students under computer control; (2) development of simulations that were examples of the use of learning theory in an actual classroom situation; and (3) conceptualization and development of authoring template tools. Due to important administrative changes in research support, the project was aborted midway. (JD)

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FINAL REPORT OF THE FIPSE PROJECT:

"A NEW APPROACH TO THE SKILLS OF EFFECTIVE TEACHING"

Brigham Young University
College of Education
Provo, Utah 84602

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PROJECT SUMMARY

This project proposed to design and develop interactive videodiscs for teaching learning theory to teacher education students enrolled at Brigham Young University. The thesis was that simulations provided via interactive video could help prospective teachers both "see" the uses of learning theory and more readily transfer theory into practice in the classroom. Conceptualization and design phases progressed smoothly, but slowly. Administrative changes at the University changed the nature of research support such that services available at the beginning of the project were removed. By the time video production was to begin it was apparent that the continuing changes had made it impossible to deliver the course as promised. Consultation with FIPSE resulted in the cancelation of the project and the return of the remaining funds, a considerable amount as the video production would have consumed over 60% of the budget.

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EXECUTIVE SUMMARY

"A New Approach to the Skills of Effective Teaching"

College of Education
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Project Overview

Can interactive videodiscs be used to teach learning theory to teacher education students such that they will be better able to apply learning theory in the classroom? Because we had developed interactive videodisc simulations before we were confident that such was possible. With funding from FIPSE we began work under the auspices of the David O. McKay Institute at Brigham Young University. Administrative changes removed the availability of critical resources in support of research which eventually required the cancelation of the project. However, the ideas can still work; of that we are convinced.

Purpose

Too many teachers, both secondary and elementary, are taught learning theory out of context. That is, they are seldom encouraged to transfer the specifics of learning theory to actual use in the classroom as they plan lessons, deal with a range of student abilities, etc. It was believed that the use of interactive videodisc simulations to teach learning theory by demonstrating applications would help students understand and better apply that which would otherwise be abstract and out of context.

Background and Origins

Since 1979 we had experimented with the uses of interactive videodisc technology and had developed seven different products, including "Montevidisco", a project funded, in part, by FIPSE. Before that time we had developed TICCIT, a CAI contemporary of PLATO that used color graphics and video images.

With seven years of experience designing and developing interactive video materials we were confident that this technology could be used to simulate the classroom and at comparatively low cost. The classroom could be brought to the learning theory course and, further, it could be controlled. In fact, each new experience with that simulated classroom could produce different results, if properly planned.

Project Results

As the project was aborted midway through its development, no results are available that teach us about the creation of interactive video courseware for teaching learning theory.

Summary and Conclusions

The project is worth doing. We are convinced that it is both realizable and of substantial potential benefit. Problems encountered in the development of the ideas and the courseware itself were comparatively minor. The authoring system and other intelligent computer tools were working. Before the project closed we had developed the automated authoring system to the point that it was requiring us approximately 5 hours of programming/debugging for every hour of instruction. This should be compared with the 160 hours of programming required by the more efficient authoring systems extant.

The death of the project is entirely due to important administrative changes in research support, the demise of the David O. McKay Institute with its critical funding support, facilities, equipment and professional personnel, and the College of Education's failure to supply the promised backing.

FINAL REPORT FOR "A NEW APPROACH TO THE SKILLS OF EFFECTIVE TEACHING" A PROJECT SUPPORTED BY THE FUND FOR THE IMPROVEMENT OF POST-SECONDARY EDUCATION

PROJECT OVERVIEW

Background

Because we had experimented with the use of interactive videodisc technologies (microcomputers mated to videodisc players), and had learned that the use of the technology, when carefully and systematically designed, can provide substantial gains in learning, we considered the possibility of applying videodiscs to the improvement of teaching skills. Too often, teachers in training are given a set of "methods" to use in the classroom and are also taught about learning theory, but in a separate class. There is very little transfer of the methods that teachers are exposed to in the learning theory classroom and virtually no transfer of any understanding they may have had of that learning theory. Because interactive video (IV) provides very realistic simulations, we thought it appropriate to propose the development of training materials on interactive videodiscs that could be used to simulate the classroom, point out how learning theories were used or abused, and in other ways encourage transfer and therefore application of learning theory principles and specific methods from the university classroom to actually use in the elementary and secondary schools where students would be student-teaching.

Audience

The intended audiences were students in teacher training programs for both the elementary and secondary levels at Brigham Young University. It was felt that this approach was useful, as the cost for development could easily be amortized across the 900 new teacher education students who enroll each year.

Development

The design phase of the project moved more slowly than anticipated, as we conceptualized how best to communicate (demonstrate), learning theory in a variety of different settings and applications. Once the design phase was completed, scripts and lesson plans were developed that would hopefully be both examples and non-examples of the use of learning theory and methods, and in the process, an entirely new design document format was developed preparatory to delivering materials to the script writer. Several scripts were written based on the lesson plans for these scripts. The best teachers in local high schools were hired to develop and present lessons aimed at satisfying the same objectives and following the same general lesson plan. Students were recorded viewing the lessons and afterwards were also recorded as questions were asked regarding the specifics of the content, their understanding of the content, and those aspects of the lesson that they liked, disliked, saw as clear, or were unclear or confusing. These taped lessons and student responses were to be used in the final draft of the script so that we could have realistic student responses, questions, confusion, etc., in the non-examples. This way we could better anticipate problems in the lessons and make improvements in the script before the final video production began.

Outcome

The project failed to be completed. Reasons for failure are simple and political. The project was proposed under the auspices and with the support of the David O. McKay Research Institute, whose major purpose was to support educational research at Brigham Young University. Project management, budget tracking, purchasing support, word processing support, data tabulation and data entry support, programming support, and other clerical support services were all available in the McKay Institute and were assumed as an integral part of the project. Shortly after funding was awarded, the central administration abolished the David O. McKay Institute. With those changes, promises were made from the College of Education that research would continue to be supported at the same level experienced with the existence of the Institute. While it didn't seem possible with the changes that were occurring, the project director believed that the administration was supportive of research in the College, and that if problems were discovered, they would be remedied. Over the first year of the project, support was provided, but at an ever-decreasing level. During the second year of the project, there was virtually no support available except in the person of one programmer. This slowed the project down to the point where it became apparent that it could not be completed within the budget and schedule earlier agreed to, and it was decided between the project director and the program officer at FIPSE to return the remaining funds to Washington.

PURPOSE

It is typical in teacher education programs to teach learning theory in one class, to provide "methods" in another class, and to expect students to remember and transfer information acquired in these courses to the classroom as they begin their student teaching. The problem is that most students are unable to transfer learning theory into actual practice because of the way that it's taught, and virtually no students make any connection between learning theory, methods, and the real world experience of teaching in the classroom. The project's main goal was to provide, through interactive videodisc technologies, the opportunity for students to actually see learning theory being applied, to "create" their own simulations where learning theory and the methods are being demonstrated, and in other ways to provide practice with simulations of the classroom environment while they were studying learning theory and methods.

The purpose of the project and the techniques and tools selected to attack the problem still seem to be appropriate, and it is felt that they hold out substantial promise for solving such problems. Problems in this project were not related to the solutions proposed, but the politics at the institution and changes that occurred in the support of research at the College of Education shortly after the project began.

In retrospect, as political changes occurred in the university, it would have been wise for the project director to have extracted from central administration commitments in writing regarding continued support of research, especially for this project, so that when research support lagged and eventually disappeared, those commitments could have been extracted. While the commitment to FIPSE by the institution was tantamount to the same as extracting such commitments from the central administration, the bureaucracy of a large organization can be such that it is difficult to get central administration to understand that there really are problems and needs that aren't being addressed.

The problems encountered by the lack of support at the college level were exacerbated by the fact that vice presidents responsible for research had never been involved with this type of research. Their experience had been primarily historical research or research projects requiring the attention of one professor and one or two graduate students in an existing lab. It was difficult for them to understand the labor-intensive nature and the need for the expertise of different members of a team, all of whom would be working on the project.

BACKGROUND AND ORIGINS

The College of Education of Brigham Young University typically enrolls 900 students each year as teacher education candidates. This volume of students necessitates several sections of learning theory and methods classes, requiring the attention of several professors. If technology could be used to help in the class load and could be used to extend the influence of the professor, especially in encouraging the students to transfer information that they are receiving in class to real world settings, then the expense to develop and use such a technology may be justified. The college administration generally supported the idea of the research and was hopeful that it could provide the hoped for service and begin to solve the problem of transferring learning theory to a real-world setting.

The research was proposed through and under the auspices of the David O. McKay Institute of Education, a research institute charged with development, evaluation, and research responsibilities at Brigham Young University. That Institute supported research in a variety of ways including tracking projects, managing projects, tracking budgets, supporting purchasing needs, tabulating and processing data, word processing, and a number of other supports such as a vehicle, conference room space, etc. The David O. McKay Institute included some of the best aspects of a business with some of the better qualities of higher education in the same body. It was a unique organization in which to conduct research and development projects.

A few months after the project began, the central administration at Brigham Young University dissolved the David O. McKay Institute. As this occurred, both central administration and the college administration promised continued support of research at the level and in the way that it was supported by the Institute. While it did not seem logical to assume that such support could be made available without personnel, space, equipment, etc., those of us involved in the project were hopeful that the college would make good its promise by transferring resources, assigning personnel in support of the work, or through other such tactics. Over the first year of the project, support of research declined drastically, such that during the second year of the project there was no support whatsoever. Even the simplest typing requirements moved at a snail's pace with simple two or three page documents taking five to ten days to be typed. Complaints regarding the lack of support were regularly logged with the department chairman and the dean in the College of Education. It's not possible to determine whether those complaints were not believed or if other matters were deemed more important. But whatever the reason, nothing changed, except the resources in support of research constantly and consistently diminished to the point of non-existence.

PROJECT DESCRIPTION

Instructional Materials Examples

Our project had three primary emphases: 1) the transfer of different forms of instructional materials to videodisc so that these might be evaluated by the students under computer control. The computer would provide prompts and helps such that the students could evaluate the existence or non-existence of different learning theories and their application to the courseware they would review. We assumed that if we could get permission to transfer sections of manuals, texts, filmstrips, and short video tapes to videodisc, and then place these under computer control, we could better sensitize the students to notice that which we would hope they would see in the materials, the organization and use of important learning theory principles. We had used this approach in the past to help students notice critical elements in a film and the procedure appeared to work very well in four replicated studies. Our thought was that tying what we wanted the students to notice to comments or commentary provided by the instructor would help them begin to make the transfer of learning theory to use of instructional materials.

Simulations

2) The second element of the project was the development of important simulations that were both good and poor examples of the use of learning theory in an actual classroom situation. We assumed that if we could simulate the classroom environment in ways that would make it possible for the students to practice the application of important learning theory principles that they would be more likely to actually try to apply the same principles in a classroom setting during their student teaching. Research has shown in other fields that the ability to practice new concepts and ideas in a safe environment drastically increases the chances that an individual will try those new techniques in the real world when given the chance.

Authoring Tools

The third major emphasis in the project was the conceptualization and development of authoring template tools that would make it possible to develop computer programs for interactive videodisc technologies without having to write a single line of code. We conceptualized the idea of having the computer read an electronic version of the script, and to translate that into a computer program that would be used by the student at run time. It was our belief that substantial reduction in costs and time could be realized if such authoring systems could be developed permitting the computer to actually write the computer program rather than our creating that program with source code or an authoring system, (such as Quest, Authority, or Pilot).

The development of these authoring tools went well, and the programmer actually completed the work on a prototype version and began a revision of this program. He was in the process of debugging the final version when the project ended. We estimate that the authoring system is 95% completed, and that it would take a month or less of effort to actually have an authoring system available that would require no computer programming whatsoever on the part of an author desiring to create computer assisted instruction or interactive video training materials. The real tragedy of this project is that we came so close to creating this labor saving tool, yet had to pull the plug, literally one man month away from its realization.

Researching Existing Materials

We spent many hours looking at existing texts, workbooks, videotapes, films, filmstrips, and other media related to the areas of instruction that we had selected in this demonstration project. We read through physics texts, biology texts, chemistry texts, spent several days reviewing mathematics workbooks and texts, and in other ways did our best to identify instructional materials that we could transfer to videodisc for the purposes mentioned above. We identified sections of textbooks, filmstrips, and short video clips that we desired to transfer to videodisc, and were at the point of asking for permission to do so when we asked ourselves serious questions about the advisability of beginning the video production phase.

Content Development

As we conceptualized the lesson plans, how to tie lessons to learning theory in ways that would be obvious to the trainees, we developed a new form for planning lessons. This new conceptualization led to the development of several lessons in physics, chemistry, and math. From these comprehensively developed lesson plans, several were selected for original scripting and were handed to a script writer familiar with interactive video and the goals of the project.

While the script writer was writing the first draft of the script/lesson plans, we handed out objectives and brief versions of the lesson plans to teachers identified in the local school district as excellent in their discipline. Teachers in math, chemistry, and physics developed their best lessons for the objectives indicated in the lesson plans we circulated, and the best of those groups were asked to teach their lessons in front of a live audience while we videotaped both the lesson and the audience's reaction. Following the lessons, the audiences were recorded while we asked specific questions related to the content of the lesson, and then general questions regarding how the lesson was presented, how clear it was, etc. The intent of these video tapings was to provide us additional "fodder" for the scripting process. We needed to, in our simulation model, provide appropriate feedback responses and we wanted to know what students' real reactions were to these lessons. We also wanted to develop a series of non-examples and inappropriate examples from those lessons so that, in our simulations, we could lead trainees down the garden path and then point out where they had gone wrong, hoping that, in subsequent uses of the system, they would not make the same mistake in the misuse of the learning theory we were supporting.

Resource Problems

At the point of completing the video tapings, and finishing the first draft of the scripts, we began computing the video production costs. At this point in time, our plans for producing the video on campus were altered. Up until that date we had an agreement with the Department of Communications to use student producers and directors (but professional talent) and their lower cost Betacam equipment to actually go on location and shoot the footage. The costs to us would be minimal since we would only have to pay for the rental of the equipment at a preferred rate. However, as we finished the scripting, policies changed such that we would have to pay full price for all video production work whether completed with students or without, whether we used professional Ikegami cameras or less costly Betacam equipment. This difference meant that we would go from an estimated video production cost of $400 a finished minute to at least $1,000 a finished

minute, with the possibility that those costs could be $1500 or $2000 a finished minute for video production.

Redirection?

This, combined with the total lack of research support on the part of the College made us call a halt to the project so that we could re-group and plan anew how we might attack the new set of problems. As we carefully computed time lines and costs we decided that we needed to either: 1) change the level of funding, 2) focus the funds on smaller aspects of the project (in essence, redefine the projects goals), 3) go ahead with the project anyway and hope that we might be able to complete it, 4) or call it quits and return the remaining funds. Our personal preference was to redefine the project, narrowing its scope to a subset, like finishing the authoring system. It didn't seem professionally ethical to continue working on the project when it was painfully apparent that the funds would not be sufficient to complete the actual work.

As we had had substantial experience in the development and production of videodiscs in the past, we were quite confident that our estimates of cost were reasonably accurate and that, while the project as originally proposed with the support of the David O. McKay Institute would have been feasible for the amounts listed, we no longer had that support and the budget remaining was insufficient to complete the work as contracted.

Funds Returned

Discussion was opened with Washington and the FIPSE project officer discussed the alternatives with supervisors. At one point, it was determined that we ought to ask for a continuation of the funding so that the longer time lines required by insufficient research support would be legally permissible. At another point it was decided the money ought to be turned back, but later the project supervisor in Washington decided that that would not benefit anyone. It was finally decided that a letter ought to be sent to a supervisor requesting a continuation of the study and listing the problems as candidly as possible. This request was denied.

The only ethical option remaining in the relatively short time left was to return the remaining funds. Once this decision was reached and announced to the institution, to the project director's surprise, no one in the College seemed concerned about returning the money and not completing the work as contracted. This was yet a further indicator of the lack of interest in, and support of, research at the College. Sixty-two percent of the grant was left at the time we froze the funds and these monies were returned to FIPSE.

PROJECT RESULTS

In a way, there were no results of the project, at least not results related to what we planned to study and accomplish.

There were, of course, results in terms of what we learned about how institutional politics can affect research. While we're not sure that anything occurred at the institution as a result of our project, we hope that lessons have been learned by the research office on campus.

As a new director of the Office of Research Administration was appointed and learned of what had happened I was asked to visit with him and provide the details of the project, lack of research support, etc. The new director appeared sympathetic to my plight but had not been involved in research projects requiring a large team effort and the support formerly available through the David O. McKay Institute. He appeared to be somewhat surprised by a research project that would require the efforts of more than a professor and two or three graduate students. However, there were improvements in the support of research in the University as that individual took the reins of the office and he appeared genuinely concerned about the problems that we had encountered earlier.

As there were no specific research or evaluation results of our project we didn't share them through the normal channels of journal publications, presentations at learned societies etc. However, a sociological study of what occurred would be a fascinating approach to uncovering the pressures, influences and politics that scuttled our project.

SUMMARY AND CONCLUSIONS

We would still recommend our ideas and approach to practitioners. We are convinced that using interactive video as a simulation tool will help students make the transfer from theory in the classroom to practical application in the real world. We've been able to demonstrate this in other areas (counseling, languages, physics) through the use of interactive videodisc technology and are confident that it will work here as well.

Our advice to others interested in this work is that they secure the necessary institutional support and realize that it will require a team effort of instructional designers, script writers, televisions producers, programmers, typists and possibly others. While we understood the need for a team approach as we began the project, we did not clearly communicate this need to administrators who, to this day, do not understand the need. Functioning within the David O. McKay Institute (as we had for six years prior to the project's initiation) we had had no trouble creating teams and pulling in the necessary resources, collapsing and expanding expertise depending on need. All the necessary support for our work was housed in the McKay Institute and that Institute had committed an additional $30,000 of effort and support. When the support disappeared and nothing was put in its place, it took a year for our momentum to be ground to a stop. But as the project director became the typist, the budget manager, the receptionist, the writer of all documents, as well as the designer, the conceptualizer, and the manager, it became very difficult to keep all elements of the project moving in a timely fashion.

I believe that I have learned through this project that research requiring a development effort should only be undertaken within an organization where individuals know what they're doing and the necessary support system is in place. I've also learned that certain research projects probably should be brought through non-profit organizations rather than a university campus. It would actually be substantially cheaper to pay overhead to a non-profit organization outside the university and then rent university equipment and facilities or pay for individual's time than it is to pay for that time and pay the rather steep, normal university overhead. This is particularly apparent to me since that overhead was charged against the project at a time when the support was withdrawn.